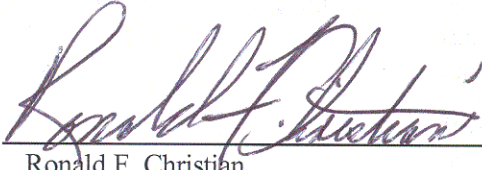
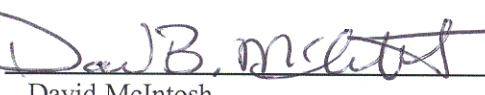
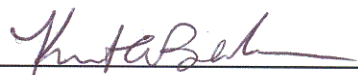
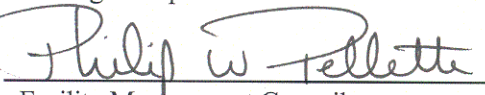


CRITERION 603
ROOFING SYSTEMS

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RECORD OF REVISIONS

Revision No.	Date	Description
0	12/05/02	Initial Issue

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CRITERION 603

ROOFING SYSTEMS

1.0 PURPOSE

The purpose of this Criterion is to establish the minimum requirements and best practices for operation and maintenance of roofing systems at LANL.

This document addresses the requirements of LIR 230-05-01(Ref 10.11), "Operations and Maintenance Manual."

Implementation of this Criterion satisfies DOE Order 430.1A (Ref 10.2) for the subject equipment / system. DOE Order 430.1A (Ref 10.2) "Life Cycle Asset Management," Attachment 2 "Contractor Requirements Document," Paragraph 2, Sections A through C, which in part requires UC to "...maintain physical assets in a condition suitable for their intended purpose," and employ "preventive, predictive, and corrective maintenance to ensure physical asset availability for planned use and/or proper disposition." Compliance with DOE Order 430.1A is required by Appendix G of the UC Contract.

2.0 SCOPE

This criterion is applicable to all Laboratory roofs. There are over 5,000,000 square feet of roof area within the LANL complex. This Criterion provides guidance to operations and maintenance personnel for roof inspection, preventive maintenance, repairs, and mounting items at, or above roof level. It does not include guidance for the selection of new roofing. New roof selection criteria are identified within the LANL Engineering Manual.

3.0 ACRONYMS AND DEFINITIONS

3.1 Acronyms

AHJ	Authority Having Jurisdiction
CFR	Code of Federal Regulations
DOE	Department of Energy
LIG	Laboratory Implementing Guidance
LIR	Laboratory Implementing Requirement
LPR	Laboratory Performance Requirement
NMED	New Mexico Environmental Department

NRCA	National Roofing Contractors Association
O&M	Operations and Maintenance
POC	Point of Contact
PPE	Personal Protective Equipment
PP&PE	Personal Property and Programmatic Equipment
RP&IE	Real Property and Installed Equipment
SSC	Structures, Systems, and Components
SSS	Support Services Contractor
UBC	Uniform Building Code
UC	University of California

3.2 Definitions

Felt. A flexible sheet manufactured by the interlocking of fibers through a combination of mechanical work, moisture, and heat, without spinning, weaving, or knitting. Roofing felts are manufactured from vegetable fibers (organic felts), glass fibers (glass-fiber felts), or polyester fibers (synthetic-fiber mats). (National Roofing Contractors Association, 1996) (Ref 10.10)

Facility Maintenance Supervisor. The LANL individual responsible for the maintenance of specific Division building assets.

Flashing cements. A trowelable mixture of solvent based bitumen, mineral stabilizers, and fibers. (National Roofing Contractors Association, 1996) (Ref. 10.10)

LANL Qualified Roof Inspection Personnel. Individuals trained to perform designated inspections, maintenance oversight, and minor design functions for specific roof types. Training includes safety training on specific roof hazards, roof defects recognition, materials compatibility, repair materials life expectancy, and minor details design. LANL Qualified Roof Inspection Personnel training requirements can be met by completing the FWO, LANL Qualified Roof Inspection Personnel training course, or an approved equal course.

Membrane Roof. A flexible or semi-flexible roof covering whose primary function is the exclusion of water.

Roof System. An assembly of interacting components designed to weatherproof, and normally to insulate a building's top surface. (National Roofing Contractors Association, 1996) (Ref. Ref. 10.10)

Service Life. Anticipated useful life of a building, building component, or building subsystem (e.g., roof system).

4.0 RESPONSIBILITIES

4.1 FWO-Systems, Engineering and Maintenance (SEM)

- 4.1.1** FWO-SEM is responsible for the technical content of this Criterion and monitoring the applicability and the implementation status of this Criteria and either assisting the organizations that are not applying or meeting the implementation expectations contained herein or elevating their concerns to the director(s).

Basis: LIR 301-00-01.11; Issuing and Managing Laboratory Operations Implementation Requirements and Guidance, Section 5.4, OIC Implementation Requirements. FWO-SEM shall provide technical assistance to support implementation of this Criterion.

4.2 Facility Manager

- 4.2.1** Responsible for operations and maintenance of institutional, or Real Property and Installed Equipment (RP&IE) under their jurisdiction, in accordance with the requirements of this document.
- 4.2.2** Responsible for operations and maintenance of those Personal Property and Programmatic Equipment (PP&PE) systems and equipment addressed by this document that may be assigned to the FM in accordance with the FMU-specific Facility/Tenant Agreement.

4.3 Group Leader

- 4.3.1** Responsible for operations and maintenance of those Personal Property and Programmatic Equipment (PP&PE) systems and equipment addressed by this document, which are under their jurisdiction.
- 4.3.2** Responsible for system performance analysis and subsequent replacement or refurbishment of assigned PP&PE.

4.4 Authority Having Jurisdiction (AHJ) - POC for Architectural Chapter of LANL Engineering Manual

The AHJ is responsible for providing a decision on a specific technical question regarding this criterion.

5.0 PRECAUTIONS AND LIMITATIONS

5.1 Precautions

This section is not intended to identify all applicable precautions necessary for implementation of this Criterion. A compilation of all applicable precautions shall be contained in the implementing procedure(s) or work control authorization documents. The following precautions are intended only to assist the author of a procedure or work control document in the identification of hazards/precautions that may not be immediately obvious.

- 5.1.1** Roofing projects involving the removal of more than 160 square feet of regulated asbestos containing material must provide notice to New Mexico Environmental Department (NMED) at least 10 working days prior to removal. RRES-MAQ-17 will prepare and submit notifications to NMED.

Basis: Laboratory Implementation Requirement LIR 404-10-01.1 (Air Quality Review) and 40CFR61.145.

- 5.1.2** Some old roofing felts and plastic cements may have been manufactured with asbestos fibers. Comply with Laboratory standards to identify, handle, penetrate, or dispose of suspect asbestos laden materials. Refer to LIR 402-570-01, Asbestos.

- 5.1.3** Provide for fall protection utilizing OSHA 29CFR 1910 Subpart D and LIR 402-10-01.5 "Hazard Analysis and Control for Facility Work".

5.2 Limitations

The intent of this Criterion is to identify the minimum generic requirements and recommendations for SSC operation and maintenance across the Laboratory. Each user is responsible for the identification and implementation of additional facility specific requirements and recommendations based on their authorization basis and unique equipment and conditions, (e.g., equipment history, manufacturer warranties, operating environment, vendor O&M requirements and guidance, etc.).

Nuclear facilities and moderate to high hazard non-nuclear facilities will typically have additional facility-specific requirements beyond those presented in this Criterion. Nuclear facilities shall implement the requirements of DOE Order 4330.4B (Ref. 10.3) as the minimum programmatic requirements for a maintenance program. Additional requirements and recommendations for SSC operation and maintenance may be necessary to fully comply with the current DOE Order or CFR identified above.

6.0 REQUIREMENTS

Minimum requirements that Criterion users shall follow are specified in this section. Requested variances to these requirements shall be prepared and submitted to FWO-SEM in accordance with LIR 301-00-02 (Ref. 10.4), "Variances and Exceptions to Laboratory Operations Requirements," for review and approval. The Criterion users are responsible for analysis of operational performance and SSC replacement or refurbishment based on this analysis. Laws, codes, contractual requirements, engineering judgement, safety matters, and operations and maintenance experience drive the requirements contained in this section.

6.1 Operations Requirements

Facility Maintenance Supervisors who have warranties in effect must comply with the provisions of those warranties throughout the duration of the warranty period.

Basis: Reference 10.4, Section 1.3, recommends this action.

No further requirements beyond those stated in Section 5.2, Limitations.

6.2 Maintenance Requirements

No further requirements beyond those stated in Section 5.2, Limitations.

7.0 RECOMMENDATIONS AND GOOD PRACTICES

The information provided in this section is recommended based on acceptable industry practices and should be implemented by each user based on his/her unique application and operating history of the subject systems/equipment.

7.1 Operations Recommendations

Inspect each roof twice annually, once in the spring and again in the fall. The inspection should include the removal of trash, debris and abandoned materials and equipment.

7.1.1 Seasonal Readiness Checks

Seasonal “readiness checks” should be conducted for each roof semiannually. The checks should include the removal of trash and debris from roof surfaces; clearing drains, gutters and scuppers of obstructions (as applicable); and identifying defects requiring maintenance, or repair by “trained maintenance personnel.” These checks should be conducted during the months of April and October each year. To facilitate consistency and to enhance the ability to evaluate a building’s changing roof conditions, facility personnel should develop a customized roof checklist for each building. As a minimum, each checklist should address the applicable points identified within the latest edition of the FWO-SEM, SEMIANNUAL ROOF CHECKLIST, form # FWO-SEM 00-M-RFC-S001, see Appendix A.

Special or unscheduled roof inspections should be conducted whenever events occur that could affect the integrity of the roof system such as; unusually high winds, temperature extremes (cold or hot) or fires.

Basis: Reference 10.4, Section 5.0, Owner Performed Maintenance, recommends this activity.
Reference 10.9, recommends this action.
Reference 10.8, DOE-OEW, 97-42, recommends this action.

Only trained personnel who have completed the FWO Roof Seasonal Readiness Inspection short-course, or an approved equal should conduct seasonal Readiness Checks.

7.1.2 Access to roofs should be controlled to minimize personal injuries and roof damage caused by unauthorized personnel.

Basis: Reference 10.4, Section 7.0, recommends this action.

7.1.3 Infrared Thermography should be used periodically to inspect roofs for subsurface moisture infiltration and to guide repair efforts. Infrared Thermography frequency should be established for individual building roofs based on several factors, such as; roof slope, type of roof covering materials, roof age, type and location of roof insulation, and the consequences of potential insulation damage, or roof leaks.

Basis: Reference 10.4, Section 4.0, Roof Inspections and Reference 10.5, Section 4.0, Roof Inspections, recommends this activity.

7.1.4 Roof Top Equipment Mounting and Penetrations

With few exceptions, roofs are designed and constructed to protect buildings and their contents from the elements and airborne intrusion, *only*. The placement of equipment, experiments, or other items onto the roof’s surface frequently causes premature deterioration of the surface.

Designs and appropriate details that maintain an affected roof system’s integrity should be prepared by a “qualified roofing professional” before penetrations,

equipment, experiments, or other roof mounted items can be authorized. Wood sleepers (4"x 4" beams resting directly on the roof surface to support roof mounted items) should not be used under any circumstances. Designs and details should comply with the Laboratory's Facility Engineering Manual.

Basis: Reference 10.4, Section 7.0, Installation of New Penetrations or Equipment and Reference 10.10, The National Roofing and Waterproofing Manual, Fourth Edition, National Roofing Contractors Association, 1996.

7.1.5 Periodic Inspections

Roofs should be inspected at least once every two years by LANL "qualified roof inspection personnel." To facilitate consistency and enhance the ability to evaluate a building's changing roof conditions, inspectors should use the latest edition of form # FWO-SEM 00-M-RFI-BE003, PM Roof Inspection Form, see Appendix B.

Special roof inspections should be conducted whenever events occur that could affect the integrity of the roof system; such as unusually high winds, excessive foot traffic, maintenance or construction activities, unusual temperature extremes, hail, or fires.

Basis: Reference 10.8, DOE-OEW, 97-42, recommends this action.

7.2 Maintenance Recommendations

Facility maintenance supervisors should develop a roof maintenance program that includes roof inspection requirements, roof repair schedules, roof drain maintenance, and efforts to minimize traffic on roofs to extend roof life.

Basis: Reference 10.8, DOE-OEW, 99-26, recommends this action.

7.2.1 Roof corrective maintenance should be initiated as soon as possible after the identification of defects.

Basis: Reference 10.4, Section 5.0, recommends this action.

7.2.2 Only craftsmen trained to service specific roof systems should be allowed to perform maintenance and repairs on those roof systems. The roof system's manufacturer should be the source of training if the manufacturer can not be identified then training should be based on National Roofing Contractors Association (NRCA) recommended practices.

Basis: Reference 10.4, Section 5.0, recommends this action.

7.2.3 Facility Maintenance Supervisors who have warranties in effect should comply with the provisions of those warranties throughout the duration of the warranty period.

Basis: Reference 10.4, Section 1.3, recommends this action.

7.2.4 Lightning Protection System Reinstallation

Return all lightning protection components to their original location and configuration as soon as roofing maintenance materials have cured.

An individual knowledgeable and trained in the requirements of NFPA 780 and O & M Criterion 507 - Lightning Protection Systems, should perform the reinstallation of building lightning protection systems. The reinstalled lightning protection system should be assembled with the same materials and methods of construction as those removed or better. Laboratory lightning protection system specialists in compliance with O&M Criterion 507 inspect the reinstalled system. This certification requirement does not apply to the spot removal and reattachment of individual system components.

Basis: Reference 10.16, LANL- Facility Construction Manual, 16670, Sec. 1.5.A, recommends this action.

7.2.5 Traffic Patterns

Pedestrian and/or equipment traffic patterns across roofs should be identified and monitored for roof surface damage. Roof surface protection should be provided where observations indicate either actual or potential damage. Stairs and platforms should be provided where dangerous areas exist. Permanent work ladders should be installed where possible.

8.0 GUIDANCE**8.1 Operations Guidance**

8.1.1 No implementing guidance available.

8.2 Maintenance Guidance

8.2.1 Provided it has been reviewed and approved by FWO-SEM, an acceptable program for roof maintenance may be found in PMI 40-30-002, "Roof Maintenance and Repair Program." (Reference 10.6).

9.0 REQUIRED DOCUMENTATION

Maintenance history shall be maintained for roofs to include, as a minimum, the parameters listed in the Table 9-1 below:

Table 9-1 Documentation Parameters

MAINTENANCE HISTORY DOCUMENTATION PARAMETERS				
PARAMETER	ML 1	ML 2	ML 3	ML 4
Maintenance Activities				
Repair / Adjustments	X	X	X	X
PM Activities	X	X	X	X
Equipment Problems				
Failure Dates	X	X	X	X
Failure Root Cause	X	X	X	X
Inspection Results				
Inspection Date	X	X	X	X
SSC Condition	X	X	X	X

Basis: Documentation of the parameters listed in Table 9-1 above satisfies the requirements of LPR 230-07-00, Criteria 2, (Ref. 10.15) which states; "Maintenance activities, equipment problems, and inspection and test results are documented."

10.0 REFERENCES

The following references, and associated revisions, were used in the development of this document.

- 10.1 LIR 230-05-01, Operation and Maintenance, (07/16/98).
- 10.2 LIR 301-00-02, Exceptions or Variances to Laboratory Operations Requirements, (04/28/00).
- 10.3 Uniform Building Code.
- 10.4 Manual for Inspection and Maintenance of Built-Up and Modified Bitumen Roof Systems: A Guide For Building Owners, National Roofing Contractors Association, 1996.
- 10.5 Manual of Roof Inspection, Maintenance, and Emergency Repair for Existing Single-Ply Roofing Systems, National Roofing Contractors Association, 1996.
- 10.6 PMI 40-30-002, "Roof Maintenance and Repair Program."
- 10.7 DOE Order 4330.4B, Maintenance Implementation Plan.

- 10.8** DOE Operating Experience Weekly.
- 10.9** Manual of Low Slope Roof Systems, Third Edition, C.W. Griffin and Richard Fricklas, 1996.
- 10.10** The National Roofing and Waterproofing Manual, Fourth Edition, National Roofing Contractors Association, 1996.
- 10.11** LIR 230-05-01.0, Operation and Maintenance Manual.
- 10.12** DOE O 430.1A, Attachment 2 “Contractor Requirements Document” (Paragraph 2, Sections A through C), a requirement of Appendix G of the UC Contract.
- 10.13** DOE Order 4330.4B, Maintenance Management Program, Section 3.4.9.
- 10.14** LIR 301-00-02.0, Variances and Exceptions to Laboratory Operation Requirements.
- 10.15** LPR 230-07-00.0; Maintenance History, Performance Criteria [2].
- 10.16** LANL- Facility Construction Manual, 16670

11.0 APPENDICES

Appendix A: Semiannual Roof Checklist, FWO-SEM 00-M-RFC-S001.

Appendix B: PM Roof Inspection Form, FWO-SEM 00-M-RFI-BE003.

APPENDIX A

SEMIANNUAL ROOF CHECKLIST SEM - 0010



SEMIANNUAL ROOF CHECKLIST

TA: _____ Log # _____ Roof Section: _____ Inspection Date: _____
Bldg: _____ Roof Type: _____ Inspector: _____

	Problems			Problems - Resolutions	Date of Repair
	OK	Minor	Major		
A. ROOF ACCESS (if provided):					
1. Ladder/Stairway is Unobstructed _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
2. Rungs/Stairs are Secure and Functioning Properly _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
3. Hatch/Access Door is Functioning Properly _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
B. ROOF SURFACE:					
<i>Remove:</i>					
1. Debris, Trash, and Unauthorized Items* _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
2. Vegetation** _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
C. DRAINS, SCUPPERS, AND CANALES:					
<i>Remove:</i>					
1. Dirt, Debris, Trash, all Obstructions to Draining* _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
<i>Adjust:</i>					
2. Strainers _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
3. Air Terminals _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
D. ROOF PARAMETER (Anchorage to the building and weather readiness):					
INSPECT AND REPAIR AS NECESSARY;					
1. Gutters and Downspouts _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
2. Fascia _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
3. Stack/Equipment Supports _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
E. ROOF PENETRATIONS:					
1. Pipes/Vents _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
2. Electrical Conduit _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
3. Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
F. EQUIPMENT:					
1. Access Covers _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
2. Weeps/Drains _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
3. Ducting _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
4. Support/Pitch Pan Flashing _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
G. EXTERIOR WALLS:					
1. Stained _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
2. Damaged _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
H. INTERIOR WALLS AND CEILING:					
<i>Walls:</i>					
1. Stained _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
2. Damaged _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
<i>Ceilings:</i>					
3. Stained _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
4. Damaged _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
I. ACCESSORIES:					
1. Guy Wire Tension _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
2. Heat Tape _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
3. Pipe/Conduit Supports _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
4. Walkway _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
5. Skylights _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
6. Lightning Protection System _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
J. OTHER DEFICIENCIES:					
_____	<input type="checkbox"/>	<input type="checkbox"/>		_____	_____
_____	<input type="checkbox"/>	<input type="checkbox"/>		_____	_____
_____	<input type="checkbox"/>	<input type="checkbox"/>		_____	_____
_____	<input type="checkbox"/>	<input type="checkbox"/>		_____	_____

*Be sure that all hazards associated with items considered for removal are properly addressed.

** Vegetation growing through the roof surface should be removed by trained personnel, or a roofing professional. The roof must be repaired immediately upon the removal of vegetation.

Form - SEM-0010

APPENDIX B

PM ROOF INSPECTION FORM SEM - 0011

APPENDIX B

PM Roof Inspections

Z#: _____ ID Number: 1 Team#: _____
 TA: 0 Bldg: _____ Date: _____
 Previous Inspection Date: _____

I. Supporting Structure

A. Exterior and Interior Walls

	OK	Problem Minor	Major	Date of Repair
Expansion/Contraction _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Settlement/Cracks _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Deterioration/Spalling _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Moisture Stains/Efflorescence _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Physical Damage _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comment _____

B. Exterior and Interior Roof Deck

Securement to Supports _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Expansion/Contraction _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Structural Deterioration _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Water Stains/Rusting _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Physical Damage _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Attachment of Felts/Insulation _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
New Equipment/Alterations _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comment _____

II. Roof Condition

A. General Appearance

Debris _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Drainage _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Physical Damage _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
General Damage _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
New Equipment/Alterations _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comment _____

B. Surface Condition

Bare Spots in Gravel/Ballast Displaced _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Alligatoring/Cracking _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Slippage _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comment _____

C. Membrane Condition

Blistering _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Splitting _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Ridging/Wrinkling _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Fishmouthing _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Loose Felt Laps/Seams _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Punctures, Fastener Backout _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Securement to Substrate _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Membrane Shrinkage _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Membrane Slippage _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comment _____

PM Roof Inspections

ID Number: 1

III. Flashing condition

A. Roof Perimeter Base Flashing

	OK	Problem Minor	Major	Date of Repair
Punctures or Tears _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Deterioration _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Blistering _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Open Laps _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Attachment _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Ridging or Wrinkling _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comment _____

B. Counter Flashing/Termination Bars

Open Laps _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Punctures _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Attachment _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Rusting _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Fasteners _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Caulking _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comment _____

C. Coping

Open Fractures _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Punctures _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Attachment _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Rusting _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Drainage _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Fasteners _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Caulking _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comment _____

D. Perimeter Walls

Mortar Joints _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Spaling _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Movement Crack _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comment _____

IV. Roof Perimeter Edging/Facia

Splitting _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Securement _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Rusting _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Felt Deterioration _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Fasteners _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Punctures _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comment _____

PM Roof Inspections

ID No: 1

V. Roof Penetrations

A. Equipment Base Flashing-Curbs

	OK	Problem		Date of
		Minor	Major	Repair
Open Laps _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Punctures _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Attachment _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comments _____

B. Equipment Housing

Counter Flashing _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Open Seams _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Physical Damage _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Caulking _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Drainage _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comments _____

C. Equipment Operation

Discharg of Contaminants _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Excessive Traffic Wear _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comments _____

D. Roof Jacks/Vents/Drains

Attachment _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Physical Damage _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Vents Operable/Screens Cleaned _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comments _____

VI. Expansion Joint Covers

Open Joints _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Punctures/Splits _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Securement _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Rusting _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Fasteners _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comments _____

VII. Pitch Pockets

Fill Material Shrinkage _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Attachments _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comments _____